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## Notice of Allowability

Application No.

10/605,362

Examiner

Jennifer M. Kennedy

Applicant(s)

EDLEMAN ET AL.

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 4/12/2005 and the interview conducted 5/4/2005.
2. ☒ The allowed claim(s) is/are 8-26.
3. ☒ The drawings filed on 12 April 2005 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
Jennifer M. Kennedy  
Primary Examiner  
Art Unit 2812

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Pamela M. Riley on May 4, 2005.

The application has been amended as follows:

Claims 1-7 have been cancelled.

In claim 8, line 6, after "without protecting sides of said titanium nitride columns", insert --, and without affecting surrounding materials, wherein said etching process attacks only in the uppermost portion of said titanium nitride columns, such that, after said etching process is completed, the remaining lower portions of said titanium nitride columns are substantially unaffected by said etching process--.

In claim 15, line 7, after, "to remove an upper portion of said titanium nitride columns," insert --, without protecting sides of said titanium nitride columns, and--.

In claim 22, line 7, after, "to remove an upper portion of said titanium nitride columns," insert --, without protecting sides of said titanium nitride columns, and--.

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The following is an examiner's statement of reasons for allowance: the prior art, either singly or in combination, fails to anticipate or render obvious, the method of forming a trench capacitor structure including the limitations of etching said titanium nitride columns using halogen-based chemistry that is substantially ion free to remove an upper portion of said titanium nitride without protecting sides of said titanium nitride columns and without affecting surrounding materials, wherein said etching process attacks only in the uppermost portion of said titanium nitride columns, such that, after said etching process is completed, the remaining lower portions of said titanium nitride columns are substantially unaffected by said etching process in combination with other limitations of independent claim 8.

Further, the prior art, either singly or in combination, fails to anticipate or render obvious, the method of forming a trench capacitor structure including the limitations of dry etching said titanium nitride columns using halogen-based chemistry that is substantially isotropic to remove an upper portion of said titanium nitride, without protecting sides of said titanium nitride columns, and without affecting said polysilicon liner, wherein said etching process attacks only in the uppermost portion of said titanium nitride columns, such that, after said etching process is completed, the remaining lower portions of said titanium nitride columns are substantially unaffected by said etching process in combination with other limitations of independent claim 15.

Finally, the prior art, either singly or in combination, fails to anticipate or render obvious, the method of forming a trench capacitor structure including the limitations of

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dry etching said titanium nitride columns using halogen-based chemistry that is substantially ion free to remove an upper portion of said titanium nitride, without protecting sides of said titanium nitride columns, and without affecting said polysilicon liner, and without affecting a remaining lower portion of said titanium nitride columns and wherein said halogen-based chemistry comprises 5%-95% of at least one of chlorine based reactants and bromine-based reactants and less than 5% fluorine based reactants in combination with other limitations of independent claim 22.

The examiner notes that Rajeevakumar discusses forming a protective layer along the sidewalls of the titanium nitride to prevent etching of the protected portions. Further, while Alers et al. disclose an embodiment in which the sidewalls of the titanium nitride are not protected, the surrounding materials are etched (see Alers et al., column 4, 25-50).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


### ***Drawings***

The drawings were received on April 15, 2005. These drawings are acceptable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jennifer M. Kennedy  
Primary Examiner  
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